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Halichæres tremebundus. All these and several other species are figured.

3. The Chætodontidæ and related families are next discussed. Twenty-seven species being represented in Japanese waters. The new species are *Cyttopsis itea*, *Chætodon dædalma*, *Holacanthus ronin*, and *Coradion desmotes*. The first-named species, *itea*, should not have been placed in *Cyttopsis*, as it has the ventral rays I, 9, and the breast broad and flat, with feeble plates. It is made elsewhere the type of a new genus, Zen Jordan, its name becoming *Zen itea*.

4. A discussion of the Blennies. This interesting group of fishes is well represented in all the rock pools of the Japanese islands, — the elongate species, with many vertebræ in the north; the short-bodied, tropical forms to the southward. Forty-four species are described, representing twenty-four genera. Of these genera, the following — Zacalles, Azuma, Zoarchias, and Abryois — are here characterized for the first time. Twenty species are described as new, most of these represented by great numbers of specimens, the outlying rocks of Hakodate and Misaki proving especially rich in fishes of this type. The plates are the work of Mrs. E. C. Starks and of Capt. Charles B. Hudson, and deserve especial commendation for their accuracy and neatness.

5. The Balistidæ and Ostraciidæ. Twenty-four species are described, two of them being new. These are *Brachaluteres ulvarum* and *Rudarius ercodes*. *Rudarius* is a new genus allied to *Monacanthus*.
D. S. J.

Notes on Recent Fish Literature.—In the *Bulletin* of the *Museum of Comparative Zoology* (Vol. XXXIX, No. 3) Dr. C. R. Eastman gives a valuable series of notes on extinct cestraciont and acanthodian sharks.

The extraordinary species of *Edestus* and other extinct forms are thought by Eastman to be consolidated whorls of teeth of cestraciont forms. These extraordinary structures have formed a standing puzzle, it being uncertain whether their nature was that of teeth, of fin spines, or, as conjectured by Karpinsky, of a coiled horn at the tip of the snout. The critical study of these structures by Dr. Eastman leaves little doubt that these structures in *Edestus*, *Campyloprion* and *Helicoprion* are really teeth.

Dr. Eastman describes a number of fin spines, apparently cestraciont, referable to the genus *Ctenacanthus*. Two new species of *Acanthodes*, *A. marshi* and *A. beecheri* are described from the rich

beds of Mazon Creek, Illinois. A series of excellent plates illustrate the species under discussion.

In the *Bulletin of the United States Fish Commission* for 1901, pp. 131-159, Dr. B. W. Evermann and E. L. Goldsborough describe the fresh water fishes collected by E. W. Nelson and E. A. Goldman in Yucatan and neighboring regions, besides a few small collections from other points of Mexico. The new species are as follows: *Conorhynchus nelsoni* from Rio Usumacinta, *Notropis santamarie* from Chihuahua (Lake Santa Maria), *Notropis lermæ* from Lake Lerma, *Cichlasoma teapæ* from Teapa in Tobasco, and *Batrachoides goldmani* from Rio Usumacinta. The fresh water drum *Aplodinotus grunniens* was found in Rio Usumacinta. It was never before noticed south of the Rio Grande.

In the *Proceedings of the United States National Museum* (Vol. XXV, pp. 79-81), Jordan and Snyder describe two small sharks allied to the Dog-fish from deep waters of the coast of Japan. These species are black in color, and one of them *Etmopterus lucifer*, has a glandular substance in the skin of the side of the belly, which is said to be luminous in life. The other sharklet, *Deania eglantina*, differs from *Etmopterus* in its bristly surface. It is made the type of a distinct genus named for Dr. Bashford Dean. Jordan and Fowler give also a review of the Stone-wall-Perches, *Oplegnathide* of Japan. Two species are described.

In the Report of the United States Commissioner of Fish and Fisheries, for 1901, Evermann and Goldsborough catalogue the fishes and mollusks of Lake Chautauqua, 31 fishes are enumerated, the Chautauqua Muskallunge, *Esox ohioensis*, being much the most importance. — Evermann and Kendall publish notes on the fishes of Lake Ontario, 73 species, on the fishes of Lake Champlain, 54 species, and on the fishes of St. Lawrence River, 71 species, giving the known localities and the common names of each species. — In the same report Mr. William C. Kendall reviews the silver-sides or brit of the East Coast of the United States, belonging to the genus *Menidia*. These little fishes are excellent as food, and invaluable as food of the larger species. Mr. Kendall gives figures of most of the recognized species, *peninsulæ*, *audens*, *beryllina*, and *menidia*, and describes two new varieties, *Menidia peninsulæ atrimentis* from Titusville, Florida, and *Menidia beryllina cerca* from Waquoit Bay and other localities.

In the *Journal of the Imperial Fisheries Bureau of Japan* Dr. Kamakichi Kishinouye presents a monographic review of the Japanese Tai or species of the genus *Pagrus*. The *Tai* is perhaps the most valuable fish of Japan, always common, always excellent. The fish god, Ebisu, is always represented in Japanese drawings as bearing a red Tai, "Akadai," *Pagrus major* under his arm. Dr. Kishinouye rejects the supposed species *Pagrus ruber* and describes three valid species, *Pagrus major*, *Pagrus cardinalis* and *Pagrus tumifrons*. Later Dr. Kishinouye (in lit) has announced the discovery that the last named species is a *Deutex*. *Deutex tumifrons* has been described by Blecher as *Deutex hypselosoma*. The descriptions are accompanied by excellent colored plates, the work of Mr. J. Urata.

In the *Denkschriften* of the Academy of Vienna Dr. Franz Steindachner gives an account of the fishes and reptiles collected by the naturalist, Princess Therese of Bavaria, on her trip from Martinique to Guayaquil around the coast of South America. Eight new species are described and most of them figured. These are *Prionodes* or *Serranus huascarii* from Payta, *Pomadasis schyri* from Guayaquil, *Pontinus dubius* from Payta, *Mugil charlottæ* from Guayaquil, *Pimelodella yuncensis* from Pacosmayo, *Pygidium quechuorum* from Arequipa, *Loricaria aurea* from Bodega, and *Leporinus muyacorum* from Santander in Colombia. Steindachner adopts the name *Doydixodon levifrons*, referring other nominal species to its synonymy.

Dr. George A. Boulenger, in the *Proceedings of the Geological Society of London* discusses the young of the ten known species of *Polypterus*, with figures of the seven species found in the Congo, showing the peculiar external gill which looks not unlike an "archipterygium." In the young of *Polypterus lapradii* this gill is half as long as the body, extending backward parallel with the pectoral.

In the *Actes Soc. Scient. du Chili*, Dr. Federico T. Delfin, writes of the voracity of the Chilian hag-fish (*Eptatretus dombey*). He finds that one example having free opportunity to destroy fishes devoured in seven hours 18 times its own weight of their flesh. This amount was not assimilated but passed through the straight alimentary canal of the parasite, most of it little changed. The species fed to the hag-fish is in another paper described as a new genus of *Sciænidae* under the name of *Cilas montti*.

In a "Report on the Collections made by the Southern Cross," Dr. Boulenger records species of fishes taken in Antarctic regions. In this is given a useful synopsis of genera and species of Nototheniidæ, a family of fishes especially characteristic of that region.

Pleuragramma antarcticum a leptoscopoid fish, was taken at Lat. $78^{\circ}35'$ south, the southernmost fish yet known.

In the *Popular Science Monthly* Mr. Cloudsley Rutter gives the results of elaborate studies in the Natural History of the salmon of the Sacramento River.

D. S. J.

Hay on Fossil Vertebrates. — Under the head of Bibliography and Catalogue of the Fossil Vertebrate of North America, in the *Bulletin of the United States Geological Survey* (No. 179), Dr. Oliver Perry Hay has published a work of immense practical value to the student of Zoölogy. It is a conscientious and laborious compilation of the kind that wins gratitude rather than fame, although amply deserving both.

The synonymy of each name of group, genus and species is given, with a reference to the original type of each genus and the type locality of each species. The rules of nomenclature of the American Ornithologists' Union are adopted and consistently applied, and the general sequence and classification is that approved by American authors. Of fossil fishes, about 1000 species are enumerated, nearly one third as many as now inhabit the region (North America) under discussion.

The series begins with the Ichthyotomus sharks, Ichthyotomi being regarded as a "Superorder," including the Pleuropterygia and the Acanthodii as well as the Pleuracanthine sharks. As against the Ichthyotomi the other sharks are set off as a second superorder called Euselachii. The generic name, Acanthoëssus on account of priority, is substituted for the familiar name Acanthodes. It is claimed by Bashford Dean that the species on which Acanthoëssus is based is not certainly identified. Unless this plea is maintained, Acanthoëssus must stand.

A new family, Tamiobatidæ, is established for Eastman's genus, Tamiobatis, from palæozoic rocks in Kentucky. The name Pisces is defined so as to include all fishes except the sharks; Gill's name, Aspidoganoidei is used instead of the preoccupied name of Ostracodermi and Cope's later substitute of Ostracophori. The name "Aspidoganooid" seems unfortunate, as these fantastic creatures have little in common with ganoids. For a group containing the Arthrodira